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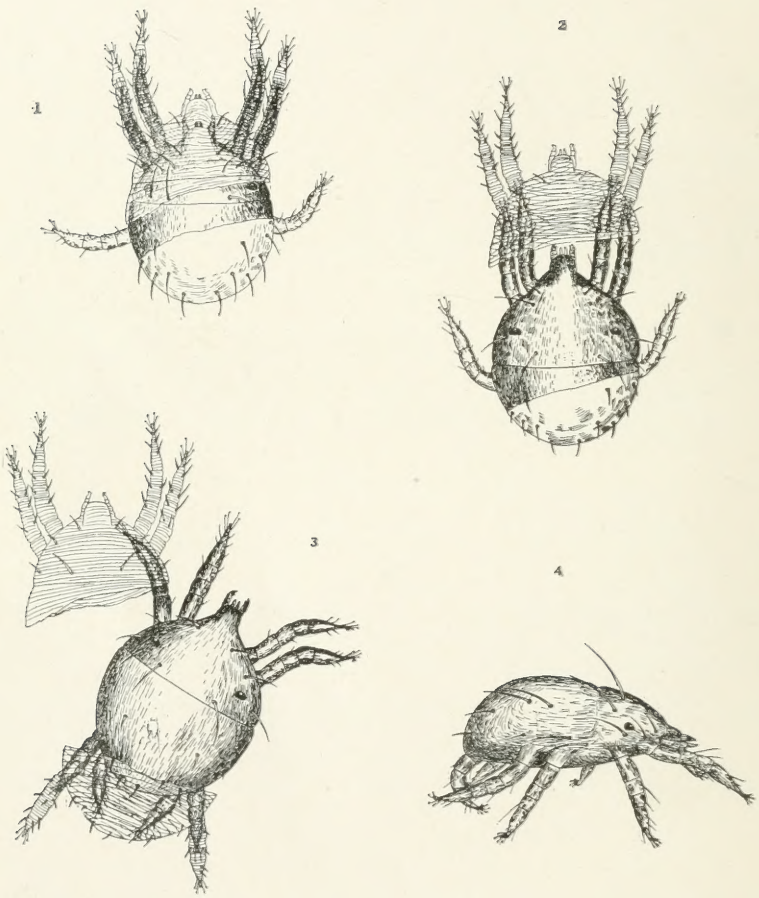

MOLTING PROCESS OF TETRANYCHUS TELARIUS L.—EWING.

ENTOMOLOGICAL NEWS

AND

PROCEEDINGS OF THE ENTOMOLOGICAL SECTION

ACADEMY OF NATURAL SCIENCES, PHILADELPHIA.

VOL. XXIII. APRIL, 1912. No. 4.

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Notes on the Molting Process of Our Common Red Spider (Tetranychus telarius L.) (Acarina).

By H. E. EWING, Corvallis, Oregon.

(Plate X)

As far as the writer has been able to ascertain, we have no record of any one having witnessed the molting process in any of the red spiders. Since the members of this family (the *Tetranychidae*) are themselves almost or quite microscopic in size, this fact is not surprising. In order to get any valuable observations of the process, it is necessary to use the compound microscope; and since the molting process occurs but three times in the life of an individual, and occupies only a few minutes many weary observations would ordinarily have to be made in order to see it.

OBSERVATION OF THE MOLTING PROCESS ON THE STAGE OF THE MICROSCOPE.

While working out the life history of our common red spider (*Tetranychus telarius* L.), a species which is known to every keeper of a greenhouse and to almost every gardener or orchardist, I was fortunate enough to observe the complete process of molting of a quiescent larva into the nymphal stage.

This was in the early part of the winter of 1909, at Ames, Iowa, where some extensive experiments on this species were being carried out.

The following detailed account of the process and the subsequent actions of the newly emerged nymph are given almost word for word as I have them from the records taken at the time.

At 11.50 A. M. on December 11th, I came into the laboratory as usual to take notes on the breeding cells. These cells were very small glass stender dishes. Each was small enough to be placed on the stage of the microscope, and each contained a single, isolated individual upon some very small, one-leaved plant. The larva in cell A 25 was observed along with the others, and at first I saw that the larva had fixed itself for a molt. But to my surprise as I examined it more carefully, I thought I saw it move slightly. At once I took my hands off the microscope to be sure that this apparent motion was not due to my own movements. The larva was now seen clearly to move. Its body was moved back and forth and sideways, but the legs were kept still. Suddenly in a single instant the skin of the old larva burst all the way across the body just behind the scapular groove on the dorsal surface. In another instant some of the dorsal bristles of the cephalo-thorax were released as if they were springs, and projected in almost their normal position. At the same time the eyes of the emerging nymph burst into view.

Now began a series of side motions and of backward strains. The hindmost larval legs were used, being extended laterally and slightly anteriorly. At the same time the muscles of the body gave it a wriggling motion. These motions continued for about one minute when the whole anterior part of the new nymph began to be drawn out of the anterior part of the old larval skin. This motion was at first rather slow until the anterior legs were released from their old sheath, when all of a sudden the whole nymph pulled loose from the anterior part of the old skin.

The now half emerged nymph, having thus shed its coat, so

to speak, began to cast off the remainder of its "old garments." This consisted of that part of the old skin covering most of the abdomen and the third pair of legs. The individual walked away about twice its own length, and after a few movements, which apparently were used for fastening the posterior part of the old skin to the surface of the leaf, it calmly walked out of the rest of its "garments." The whole time consumed in casting the skin was less than four minutes, beginning with the first noticed movement of the inert larva.

The new pair of legs which now appeared (there being four pairs in the case of the nymph, while only three pairs were present in the larva) were smaller than the rest and could not be used in walking for some time. This pair appeared just back of the third pair, as is the rule in the case of other Acarina. The larva now walked about some, but all the time it kept flexing and extending its added pair of legs. It was "trying them out" so to speak, before it could use them in walking. At 12 o'clock this nymph went to the base of the plant and stretched out its legs, and lay motionless, doubtless exhausted by the ordeal of the molting process. It remained in this position from 12 o'clock to twelve minutes after 12. Now its body began to move and soon it was "trying out" its legs again. After about three minutes the nymph began walking, but it was a shaky, unnatural gait. It kept this up until 12.17, when my observations ceased.

Some General Notes in Regard to the Molting Process.

The molting process in this species is always preceded by a quiescent period of several hours. This period is perhaps used in the reformation of some of the bodily structures, but certainly not many.

In assuming a position at the beginning of the quiescent period previous to the molt the legs are always extended, and they are nearly always attached to a fine web which the species spins.

One of the chief uses of the web which is spun by this species is as an aid in the molting process. The cast skins are nearly always found fastened to some threads of this web.

Frequently the posterior part of the cast skin is left attached to the anterior part, and is not torn entirely apart from it, as it was in the case of the individual which was observed molting under the microscope.

Although I never have observed the second and third molting processes, a study of the second and third cast skins would indicate that it is essentially the same as the first one.

The Four Stages of the Molting Process.

From the observations made of the molting process it may be divided into four stages.

The first stage (Fig. 1). This stage begins with the first movements of the body, and ends with the complete transverse rupture of the old integument.

The second stage (Fig. 2). This stage begins with the transverse rupture of the old integument, and ends with the complete shedding of the anterior part of the old skin.

The third stage (Fig. 3). Includes that part of the process between the casting of the anterior part of the old skin, and the complete freeing of the body from the posterior part of the old skin.

The fourth stage (Fig. 4). Includes that part of the process coming after the last part of the old skin has been cast and extending until the rest period due to exhaustion sets in.

A Part of the Chronology of the Molting Process as Recorded.

Ames, Iowa, December 11th, 1909.
Individual in cell A. 25.

Time:	
A. M.	
11.50	The first movements noticed in the quiescent larva. These movements were back and forth and sideways, with the legs fixed at their tips by means of the tarsal claws.
11.54	Last part of the old larval skin is detached from the body.
12.00	The new nymph stops "trying out" its new pair of legs, the hindmost pair; and stretches itself out motionless and presumably exhausted.
P. M.	
12.12	Period of rest is broken by the "trying out" of the new and old legs, but not by walking upon them.
12.15	Nymph begins walking about although its gait is not steady.
12.17	Observations stopped.

Wing Production in Aphids (Hemip.).

By J. D. Neiils, University of California, Berkeley, Cal.

The results obtained by Doctor J. Loeb by the use of chemical salts on micro-organisms, suggested to Professor W. T. Clarke that some of the polymorphism exhibited by Aphids might be due to the action of such salts. Accordingly he experimented with a series of salts*.

The method of introducing the salts into the insect was as follows: Cuttings of rose, bearing a single apterous viviparous aphid (*Nectarophora rosae*) were planted in five four-ounce tumblers containing washed and sterilized sand. The sand was wetted with saturated solutions of magnesium chloride, magnesium sulphate, potassium phosphate, sodium hydrogen phosphate and pure water, respectively. Records extending through a period of three weeks were kept with the result of an apparent and very striking effect of magnesium salts. Since this paper is not accessible to many, the results obtained by Professor Clarke are given in detail in the following table:

September Experiment	$MgCl_2$	$MgSO_4$	K_3PO_4	NaH_2PO_4	H_2O
Total Number of Aphids.....	263	142			131
Percentage of winged forms.	89	92			0.4
October Experiment					
Total Number of Aphids.....	254	268			217
Percentage of winged forms.	73				1
November Experiment					
Total Number of Aphids.....	233	228			227
Percentage of winged forms.	80	77			4.4
February Experiment					
Total Number of Aphids.....	278	271	295	146	252
Percentage of winged forms.	78	84	2	0	3

As pointed out in a paper by Professor C. W. Woodworth on Winged Aphids † the wilting of plants results in a slowing down of the birth rate, also in bringing about

* Journal of Technology, Vol. 1, Berkeley, California.

† Entomological News, March, 1908.

a spontaneous production of young with wing pads. Many species of Aphids increase until the condition of the plant is wilted or curled, due to the poisonous effect of the lice or the lack of water; then they produce winged forms and free the plant entirely.

There seem thus to be two possible explanations of wing-production in these experiments; first, there may be a stimulative action due to the chemicals, or second, it may be due to the slower development after hatching and after feeding begins. This slower development of tissue gives more opportunity for the development of wings, which would otherwise be sacrificed to the development of such tissue as the reproductive system under more favorable conditions. This retarding in development is brought about by the wilting effect produced by several agencies, as drought, excessive infestation of the plant by the lice, the preparation of the plant for winter conditions, or perhaps artificially by the presence of magnesium salts.

The writer undertook to verify the determinations made by Professor Clarke and obtained the following results:

Material	1st 3 days		2nd 3 days		3rd 3 days		Total		Percentage of
	Births	W. forms	Births	W. forms	Births	W. forms	Births	W. forms	W. forms
$MgSO_4$.....	5	3	10	10	8	8	23	21	91.3
H_2O	8	0	12	0	14	2	34	2	5.9

These results completely confirmed those obtained by Professor Clarke, but bring out the additional fact that after the first three days all the $MgSO^4$ aphids developed wing pads. This makes it possible to determine quite accurately the time during the development of the insect at which the action of magnesium became effective.

A series of experiments were made by the writer to discover whether the determination of the future development into winged or wingless aphids occurred before or after

birth. Professor Woodworth, in the paper quoted above, has pointed out that a distinction may be made between the two forms as soon as they have accomplished their first molt, thus placing one limit to this critical period. These experiments were conducted in the following manner: A cutting of rose bearing a number of young apterous viviparous aphids (*Nectarophora rosae*) was planted in a four-ounce tumbler containing washed and sterilized sand and watered with a saturated solution of magnesium sulphate. In a like manner a cutting with aphids was wetted with water. Since in the former experiments the aphids born during the first three days did not show the effect of the salt, three days were permitted to pass and then as soon as the young were born on the plant treated with magnesium sulphate they were carefully transferred to a fresh cutting bearing no aphids planted in sand, to which only pure water had been added. Those born on the plant in water were likewise transferred just after birth to a plant bearing no aphids, which had been planted in sand watered with magnesium sulphate. The following table shows the results:

	Chemicals used	
Plant on which birth occurred	$MgSO_4$	H_2O
Plant to which newly born aphid was transferred	H_2O	$MgSO_4$
Per cent. developing wing pads	0	100%

From this table it will be seen that the effects of magnesium salts on the wing production of aphids is due strictly to the salt taken by the insect after birth and that the feeding during the first day of its existence determined its future development.

These experiments do not answer the question whether the magnesium is a stimulant to the development of wing-buds or a retarder of the general development, but the much slower development of the ovaries and the slower increase in total body weight, which has been readily observed in the experiments, would seem to favor the latter idea.

The writer proposes to show the morphological differentiation between these two forms which occur during this stage in a subsequent paper.

The Known Indiana Somatochloras (Odonata.).

By E. B. WILLIAMSON, Bluffton, Indiana.

In the Journal of the Academy of Natural Sciences of Philadelphia for 1839, Thomas Say, in a paper read July 12, 1836, says of his new *Libellula tenebrosa,* "Inhabits Indiana." Twenty-five years had elapsed since the Battle of Tippecanoe; and just twenty-five years more were to pass when the cicadas and the darters with their capital W's announced another war. And forty years after the beginning of that war passed before a *Somatochlora* was again recorded for Indiana. Well did Professor Needham include one *Somatochlora* in his discussion when he wrote of "Two Elusive Dragonflies." (Ent. News, 1905).

In these sixty-five years between the captures of Somatochloras in Indiana, the State had passed from a wilderness to cultivated lands. Where the farmer as a boy caught cat-fish and snapping turtles, he plowed corn as a man. The smaller streams became tile ditches; the primitive forests, fields and pastures. What changes took place in the original plant and animal inhabitants of the State are known very meagerly even for the most conspicuous forms. The passing of the obscurer has not left a trace. Of the wild turkey and the deer we know something, but who has concerned himself with the extinction of an orchid or the loss of a dragonfly? That these questions already difficult are to be answered in the future while data are yet obtainable is scarcely to be hoped. Philanthropy is concerning itself in pure science mainly in attacking problems whose solutions may be as ready for the student thirty generations hence as at the present time. Unfortunately no one will find an opportunity to collect native orchids or Somatochloras in Wells County, Indiana, a thousand years from now. The humble apology of the writer of local lists to the student of the anatomy of the cat is not in good taste.

Thomas Say, then, in 1836, recorded *L.* (*Somatochlora*) *tenebrosa* for Indiana. On June 4, 1901, Mr. Chas. C. Deam

took a teneral female *Somatochlora* in Fountain County, which Dr. Calvert, several years ago, determined as *linearis*. Along Flat Creek in Wells County, on July 2, 1911, I took a male *S. charadraea,* and two days later, at the same location, took a male of *S. linearis*. These are the State records, scanty because of the nature of the dragonflies themselves, but especially because no one is employed, or has the leisure, to give the subject attention.

The capture of no other known species could have furnished a greater surprise than *charadraea*. The only other specimen known was taken at an altitude of about 8,000 feet in Bear Creek Canon, Jefferson County, Colorado, by Ernest J. Oslar. The elevation of Flat Creek is about 800 feet, and its name is indicative of its character, which is anything but that of a mountain torrent. Flat Creek is a tributary of Little River which it joins just above Mardenis, Huntington County. Little River, meeting the Wabash River at Huntington, is the shrunken descendant of the Fort Wayne outlet of the extinct Lake Maumee whose waters once passed into the Wabash. Flat Creek passes into Huntington County from Wells County about one and one-half miles south of the Allen County line. Its last 200-300 yards in Wells County is through brushy and rank second-growth woodland on the Simmers sisters' farm. In Huntington County it passes into a large open field, and above the Simmers woodlot it runs for nearly a mile through practically open fields and through the barnyard of the J. M. Settlemeyer farm. Mr. Settlemeyer has made some borings in the creek bottom on his farm obtaining a limited but continuous artesian water supply. He tells me that prior to these borings the creek dried up in summer. Early in July, 1911, when I collected there, it averaged possibly 3 feet in width and carried a very small amount of water. The creek bottom will average about 3 feet below the land surface in the adjoining woodland. Its course is meandering, and in a few places there are perceptible ripples over gravel bottom. The water is generally only a few inches deep, but

there is one pool where the water is possibly 2 feet deep. The banks are grass-grown or bare in places, with much willow herb and some lizard tail. The water is warmed by its exposure in fields, and is fouled by barnyards and the visits of domestic animals.

On July 2, 1911, en route to Little River, I reached the bridge over Flat Creek on the Wells-Huntington Counties line at about 8 A. M., and leaving the motorcycle on the bridge, started up the creek through the Simmers woodlot. At a short distance I saw a dragonfly, hovering like a *Tetragoneuria,* over a ripple. It left the ripple, flying upward and being lost to sight. It appeared again at the ripple, not approaching by following the creek, but "dropping down from the clouds;" and it disappeared as it had in the first instance. After a few moments' wait I followed the creek through the woods to the fields beyond without seeing any dragonflies. On my return, as I walked in the creek bed, a flash of black, yellow and green danced for a second before my eyes and as it passed to one side the net overtook it,—a brilliant male of *S. charadraea.* Possibly half an hour more was spent at the creek, and no Somatochloras were seen. Leaving the creek I went to Little River near Mardenis where I expected to find Macromias, and where I hoped, after my experience at Flat Creek, I might find Somatochloras. Collecting here without success and thinking over the morning's experience, I became more and more convinced that the first *Somatochlora* seen was a different species from the one captured. The first one seen showed no yellow at all in the two good views I had of it, while the one captured gave me a distinct glimpse of yellow, though I had but the most fleeting glance at it on the wing. So before noon I returned to Flat Creek, first a mile below where I had collected in the morning, and later at the former woods. But at neither place did I see any Somatochloras.

The next day, Monday, I made a hurried early morning trip to the creek in the Simmers' woods, and saw the *Somatochlora* again,—a good view and one that convinced me it

was not *charadraea*. That evening I rode to the creek again, a total of about 55 miles traveled that day, but in the last hour or two before dark I failed to catch a glimpse of Somatochloras. I slept that night in Settlemeyer's barn and in the morning followed the sun's first rays into the Simmers' woods. Twice I got good though distant views of the *Somatochlora*. He would drop down from over the trees, pass along the creek for a short distance, and leave like a flash. Then an hour passed and no sign of him. As I stood in the creek near where I had caught *charadraea* the Sunday before, planning my next trip after the wretch that was making the glorious Independence Day a mockery, there was a flash over a large red haw tree and in the same breath the net got him as he started to rise in passing me. And this one was *S. linearis*. Wallace somewhere tells of a headache which seized him when a butterfly slipped to freedom from his fingers. Waking and sleeping I had seen this dragonfly for nearly forty-eight hours, and my emotions I believe were as intense. On subsequent trips to the creek I failed to see any Somatochloras.

The colors of *charadraea* are as described in Ent. News, January, 1907, with the following notes:

Labrum largely brown, greenish or paler at center, clypeus brown, lighter at center below to meet pale on labrum; frons in front, below metallic area, brown; no yellow on vertex. On abdominal segment 2 an additional small yellow spot above the yellow of the genital lobe.

Eyes nile green, brilliant. Yellow markings chrome yellow, tending to gamboge.

The living colors of *linearis* may be briefly described as follows:

Labrum yellow; face brown, clypeus paler at center; frons obscure yellowish on either side against the eyes, above and slightly in front metallic dark blue; vertex and occiput dark, nearly black; eyes brilliant nile green; rear of eyes pale brown.

Thorax metallic without other color excepting the sclerite between the front wings which is pale lemon. Legs black, brown at base.

Abdomen black, segment 1 brown above; a large rounded pale yellow spot at base of genital lobe; lower lateral margins of 3 and 4 edged with gray; small lateral basal yellow spots on 5-8, all about the same size, most distinct and bright on 6 and 7, dullest and smallest on 8; a hint of lateral basal spots on 3, large but dully colored and ill defined.

Hibernation of Cicindela senilis (Coleop.).

By Frank S. Blaisdell, Sr., San Francisco, California.

It has been my custom for several years to spend the Thanksgiving Holidays at Vine Hill, Contra Costa Co., California.

Vine Hill is a railroad station on the Santa Fe Railroad, about three miles south of Benecia Bay. The region is settled up, and the land divided up into ten- or twenty-acre ranches, fruits and chickens being the main productions.

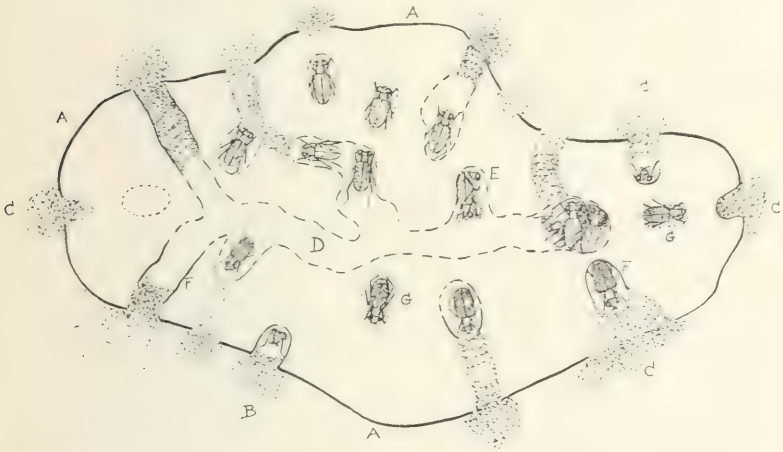
The marsh land, bounding the southern shores of Benecia Bay, sends an arm inland to the south for quite a distance, and the irregular edge of this saline area reaches the ranch at which I stop. The country in general is rolling; hills of two or three hundred feet elevation are quite common. Upon one hill in particular there are a number of white oaks on the northern and northwestern slopes.

The weather was moderately cold and dry on November 24th to the 27th, 1910, and insects at this time are all in hibernation. Collecting consists mainly in hunting out all crevices about buildings and fences, turning over of rocks and of pulling off the bark of trees. Beating oak trees over an umbrella yielded many good things. The Coccinellidæ were particularly in evidence.

After having collected from all of the oaks I took to the grain fields, where ledges cropped up here and there. Finally I worked my way to the borders of the saline flats. A short distance from the edge of a grain field, and within the marsh boundaries, a small barren knoll with croppings of a ledge attracted my attention. Heretofore it had never yielded anything more than a few *Bembidium indistincta* and *Thicanus californicus*. The surface of the ground is always crusted over with a saline exudation or deposit; this barren spot is not much more than one hundred feet square, and not much more than three feet above the general level. It is bounded by the saline marsh plants—mostly what I take to be *Salicornia*. About the ledge were three or four loose and flat rocks, which measured about two and one-half feet in length and one and one-half feet in width. As I looked about it occurred to me

that it was an ideal place for *Cicindela senilis*. After tipping over a number of small stones, I approached one of the large rocks mentioned above, and as I did so, I noticed that the lizards had been feeding upon a species of *Cicindela*. Close examination of the fragments proved them to be the remains of *senilis*. A new record, for I had never found them at Vine Hill before.

After turning over the large rock I noticed a small hole (B) at the edge of the impression (A) made by the rock, as shown in the accompanying diagram. I also observed that there was something whitish in that hole, and with my forceps



I extracted a *C. senilis*. It was torpid from the cold. At the mouth of its burrow there was a small pile of dirt (B), which looked like a miniature gopher mound. This little pile of dirt was not the only one, for all around the rock impression there were numerous others (C).

An idea occurred to me and I began to dig, and *Cicindela senilis* began to appear by the twos and fours. They were at different depths, none deeper than three inches (G), and there was distinct evidence of galleries. There was no evidence of larvæ, and the little piles of dirt told the story very clearly,—that these insects had retired to this rock and dug their way beneath it for the purpose of hibernating through the winter.

Having exhausted that colony, I passed on to another large rock, raised it, and again I could see signs of burrows and one or two *senilis* were in sight. So I determined upon a more systematic study of the burrows. The diagram shows the results.

There was one main gallery (D) with branches leading distinctly to the margins of the rock impression (A), and each branch was closed with dirt as before; some of the branches ended blindly (E).

In one end of the gallery I found five individuals that exhibited scarcely any signs of life; in the blind branches of the gallery there were usually one or two specimens. The main gallery was not more than one-half to one inch below the surface of the dirt (broken lines), and came to the surface wherever the continuous line (F) is shown in the diagram.

A number of individuals were enclosed in oval cells (G), resembling a pupal cell; these were apparently cut off from any exit, or at least I could not trace it to the margin of the rock impression. But as a rule a pile of dirt was opposite to these isolated cells, as in cases where the connection was evident.

I consider that the gallery was not community property through instinct, but through accident, as each *Cicindela* in nearly all instances had its corresponding pile of dirt at the margin of the rock impression. In most cases it was clearly to be seen that a burrow had been dug from periphery to center, and that the dirt had been pushed outward interruptedly as indicated by the transverse markings of the filled burrows.

The different individuals of the colony, in working centrally beneath the rock, would eventually meet each other, their burrows uniting; this being the case, it would undoubtedly modify and convert the gallery into community property, with the result that there would be an amicable association of individuals, which at other times would be decidedly bellicose.

Such an association apparently aroused a latent social instinct that is so well exhibited by many other species, especially the *Coccinclidae,* and for that matter some species of *Cicindelae* are social, but not all.

Sixty-four specimens were collected from beneath three rocks, and I was well satisfied that many more could be found beneath other immovable rocks of the ledge.

These insects did not develop beneath the rocks, but on the other hand sought these protected sites to hibernate.

Flies of the Leptid genus Atherix used as Food by California Indians (Dipt.).*

By J. M. Aldrich, Moscow, Idaho.

In March, 1911, as I was making plans to investigate the Ephydras and other insects of western salt and alkaline lakes, I wrote to the Commissioner of Indian Affairs in Washington, mentioning the well-known use of an *Ephydra* at Mono Lake as food by Indians, and asking if any information could be procured for me in regard to other places in the West where such food was used. The Commissioner obligingly sent a circular to employees of the service in the West, which elicited several responses, one of which brought the first intimation of the use of a Leptid fly as human food.

Mr. Joseph A. Garber, farmer in charge of the Yainax sub-agency, Yainax, Oregon, wrote down two statements made to him by Indians living at or near the sub-agency, which I am permitted to publish. The Indian name under which it is reported that the *Ephydra* was used was "Koo-chah-bie," and this was used in the circular of inquiry.

"Statement of Chief Ben Lawver:

"Ben Lawver, an old Modoc Indian now living at Yainax sub-agency says that this fly which was used for food by the Indians was called by the Modocs and Pitt Rivers Ha-lib-wah, but after the flies were prepared for use as food, the product was called Koo-chah-bie. There are a few of these flies on Sprague River in this county and they are still called the Ha-lib-wah fly by the Klamath Indians.

* This paper is one of the results of an investigation carried on with the aid of an appropriation from the Elizabeth Thompson Science Fund.

"About forty years ago when the Indians used the Koo-chah-bie as food, they would go to Pitt River in Modoc County, California, at a point about ten miles down the river from where the little village or town of Canby now is. The time for gathering the flies was some time in the early summer. The Indians would place logs across the river in about the same manner that a present-day log or lumber boom is constructed. Then they would go up stream and shake the flies off the willow bushes growing along the banks of the river. The flies falling on the water would float down stream and lodge against the logs in great quantities. As many as a hundred bushels could be gathered in this way in a single day. The Indians used a kind of basket to dip the flies from the water and carry them to the place where they were to be prepared for food.

"A pit was dug in the ground about 1½ to 2 feet deep and about 2 feet or more square. Then two layers of stones were placed in the bottom of the pit, each layer being about three inches thick. A wood fire was built on these stones and more stones were put around and over the fire. When the fire was burnt out and the stones were hot, all the stones were removed except the bottom layer. Then green tules or green coarse grass was spread out on the bottom layer of rocks. The walls of the pit were lined with hot rocks also, and this inclosure lined with tules or grass. The oven-like inclosure was then filled with the flies. These were covered with green coarse grass and the whole covered with more hot stones. Water was then poured on the hot stones of the walls of the pit, the hot stones converting it into steam.

"As soon as the water was poured on, dirt was hurriedly thrown over all to the depth of several inches. The flies were allowed to cook in this manner until the heat was pretty well expended. The dirt and grass were then removed from the top and the mass allowed to cool. When sufficiently cooled the product was taken from the oven and was ready for use as food. In this state it was called by the Modoc and Pitt River Indians 'Koo-chah-bie.' When cold Koo-chah-bie is about the consistency of head-cheese, having a reddish brown color and can be cut into slices with a knife."

"Statement of William Turner Jackson:

"William Turner Jackson, a Pitt River Indian now living near Yainax, Oregon, says that he saw this fly forty or more years ago, when he was a mere boy, in great quantities on a mountain side about eight or ten miles northeast from the postoffice or village of Lookout, in Modoc County, California. It seems that these flies, according to his statements, would gather at or near the head of a small canyon through which flowed a small stream of water. He never saw them at any other place in quantities and if one would go a quarter of a mile from this point in any direction there would be practically no flies. These flies gathered there some time in the month of May, and could be gathered by the tons. The trees, bushes and rocks were covered with them in places to the depth of five or six inches. Hence it was no trouble to gather them, for they could be scraped off the rocks and trees into great heaps. They would alight on the Indians until they were literally covered with them.

"The time of gathering them was in the cool of the morning when they were all settled and too cold to fly. In the heat of the day the air would be so filled with them as to exclude the sun and one could see but a short distance. (Where the flies came from and where they went to from this place is not known by the Indians who gave me this version of the incident.—J. A. G.)

"Indian Jackson also says that the flies were gathered in great quantities and prepared for food.

"A large pit was dug in the ground and the same materials used in constructing the oven as those mentioned in the Ben Lawver statement. But before the flies were put into the oven they were dumped into large baskets and mashed up and kneaded like a housewife works her paste when preparing to bake bread. The mass is made into loaves like bread and placed in the oven side by side. There may be a half dozen or more layers of these loaves in one oven with the hot stones between the layers. A great quantity could be cooked or baked in one oven in this manner. When this product was baked and dried it could be sliced from the loaf and used as food.

"The food was called at that time and place by the Pitt Rivers 'Why-hauts.' When the Indians had gotten as much of the Why-hauts as they needed for winter supply, they carried it away to their places of living. A great deal of this was used as winter food."

The two places described by the Indians are both on Pitt River in the southern part of Modoc County, the northeastern county of California, and are not much more than ten miles apart by the data given. The two Indians it will be noticed belonged to different tribes, which probably accounts for slight differences in handling the flies. I believe both accounts are truthful, although the quantity of material secured may be a little exaggerated.

The identification of the fly as a member of the genus *Atherix* is very easy. About the year 1900 I was at Logan, Utah, early in July, and joined a fishing party which drove to a point southeast of Avon, in the south end of Cache Valley, on a small stream in the mountains. I distinctly remember seeing masses of flies of the genus *Atherix* come floating down the stream, and in one spot where a stick lay partly under water they would lodge so that a handful could easily be picked up. At the time I had no place to put the insects for preservation, and did not collect any, but I recognized the genus. In the summer of 1898 also, at Hailey, Idaho, or a few miles above the town, I noticed on the underside of a wagon bridge crossing Wood River masses of old dead flies that had apparently been attached to the timbers of the bridge for several years; they were hanging over the water. Material which I collected here was afterwards destroyed by a fire in the University of Idaho, and again I am not sure of the species, but I collected *Atherix variegata* at Hailey on another occasion. It would be necessary to collect in the Pitt River region to feel certain of the species of the above account by the Indians.

The explanation of the gregarious habit of the fly is that the females deposit their eggs collectively in this manner. The female does not fly away from the egg mass, and other females gathering on the outside of the cluster and also depositing their eggs results in the formation of a mass of eggs and

flies several inches deep. An instance of this is cited by Ives, in *Entomological News,* i. 39, 1890, and Dr. Riley, commenting on the case in *Insect Life,* ii, 386, 1890, mentions something similar, but possibly not the same. The Ives material came from Pemberton, New Jersey.

This habit in *Atherix* is much better known in the European *Atherix ibis,* in which it has often been described. Verrall (*British Flies,* v, 288, 1909), quotes a condensed description of the habits of the species from Walker (*Ins. Brit. Dipt.,* i, 70)—"The female of this fly is gregarious, and attaches its eggs in large clusters to boughs hanging over streams, and there remains, and shortly dies. The cluster is generally pear-shaped, and sometimes contains many thousands of dead flies, and continually receives accessions by new comers settling upon it. When the larva is hatched it falls into the water, its future residence; it has a forked tail about one-third the length of the body, and has the power of raising itself in the water by an incessant undulating motion in a vertical plane." Williston, in the 3d edition of his *Manual of North American Diptera,* p. 160, also refers to this habit.

Notes on Chambers' species of Tineina (Lepid.).*

By Annette F. Braun, University of Cincinnati.

Coleophora vernoniaeella Chambers.

Coleophora vernoniaeella Chambers, Can. Ent., X, 114, 1878; Dyar, List N. A. Lep., No. 6051, 1902.

Antennae whitish, basal joint without a tuft. Labial palpi white; second joint with a very small projecting tuft and tinged with brownish ocherous on its outer side, third joint sometimes brownish ocherous on its outer side. Head and thorax white. Forewings whitish, with the extreme edge of the costa near the base dark brown, and marked with longitudinal ocherous and fuscous lines, distributed as follows: a longitudinal streak from the base through the cell, bifurcating about the middle of the cell, the upper branch following the upper side of the cell and curving down into the cilia just below the apex, the lower branch extending outwardly almost straight and reaching the cilia just above the fold; a second ocherous streak just below the fold

*(Continued from December, 1909.)

and parallel to it. There is sometimes a third ocherous streak just below the costa for about one-half the wing length. There are three or four ocherous streaks lying between the costal veins. In the darker specimens these streaks and also the longitudinal streaks before described are more or less flecked with fuscous scales. Cilia somewhat ocherous. Hindwings grayish ocherous, cilia the same. Legs whitish, the anterior pair dark brown along their outer sides. Expanse: 13-14 mm.

Chambers described this species from larval cases only, noting particularly the extreme length of the cases. The largest cases are almost an inch long, although the usual length is 15 to 18 mm., almost straight and cylindrical, but slightly tapering and roughly three-valved at the apex. The full-grown cases are found upon the leaves of Ironweed (*Vernonia fasciculata* Michx.) during May and the early part of June. One leaf may contain as many as six or seven mines. The mines are irregular in shape, often a centimetre or more across. At the time of pupation the case is usually attached to the stem. The imagoes appear during the early part of July.

Chrysopeleia purpuriella Chambers.

Chrysopeleia purpuriella Chambers, Can. Ent. VI, 73, 1874; XI, 9, 1879; Psyche, III, 64, 1880; Dyar, List N. A. Lep., 6133, 1902.

This species was originally described from captured specimens and later (Can. Ent., Vol. XI) Chambers says, "Its food plant is unknown and certainly its habits of life must differ from those of *ostryaeella*, for no mine similar to that of the latter is found in this vicinity." A year later, in Psyche, Vol. III, Chambers infers that the food plant of *C. purpuriella* is Locust (*Robinia pseudo-acacia* L.) and that certain small mines on these leaves are those of this species, because a single specimen emerged among leaves of this plant which were collected for breeding other species.

I have bred specimens which I consider to be undoubtedly the true *Chrysopeleia purpuriella* Chambers, from mines on Red Oak very closely resembling the mines of *C. ostryaeella* on *Ostrya*. The mine begins either at the margin of the leaf or along a vein and gradually broadens, its outlines being somewhat more irregular than those of *C. ostryaeella*. It shows the

characteristic tube formed of particles of excrement, and the diverging lines of excrement extending out through the mine. The larva, when full grown, leaves the mine by a circular opening in the lower epidermis and spins among the leaves an ovoid cocoon, very similar to that of *C. ostryaeella*. The mine of *C. purpuriella* is perhaps smaller in extent than that of *C. ostryaeella* and more variable in shape, due to its position and the irregularities in the outline and venation of the oak leaves.

The imagoes obtained from these mines agree closely with Chambers' descriptions. Apart from the general larger size and darker color, the best character to be used in distinguishing *C. purpuriella* from *C. ostryaeella* is, as noted by Chambers, the relative position of the central pair of scale tufts. In *C. purpuriella* these tufts are at approximately the same distance from the base; in *C. ostryaeella* the more dorsal of the pair is the farther from the base.

Apart from the improbability of the breeding of a species of this genus from so small a mine as that noticed by Chambers on locust leaves, there is the fact that Chambers' observations rested largely upon conjecture and took no account of the possibility of the accidental introduction of a cocoon already formed upon the locust leaves. In one instance I found a cocoon of *C. purpuriella* on a blackberry leaf beneath an oak tree.

I have collected the mines only during the latter part of September; the imagoes appeared the nineteenth of the following June. The species is, however, undoubtedly double brooded as the cocoon found on blackberry was collected on the 22d of July, the imago appearing on the 29th.

Opostega albogalleriella Clemens.

Opostega albogalleriella Clemens, Proc. Ent. Soc. Phil., I, 131, 1862; Tin. No. Am., 180, 1872; Busck, Proc. Ent. Soc. Wash., V, 208, 1903; Dyar, List N. A. Lep., No. 6228, 1902.

Syn. *quadristrigella* Chambers, Cin. Quart. Jn. Sci., II, 106, 1875; Busck, Proc. Ent. Soc. Wash., V, 208, 1903; Proc. U. S. N. M., XXX, 731, 1906; *accessoriella* Frey and Boll, Stett. Ent. Zeit., XXXVII, 216, 1876; Busck, Proc. Ent. Soc. Wash., V, 208, 1903; *nonstrigella* Chambers, Jn. Cin. Soc. Nat. Hist., III, 296, 1880; Busck, Proc. Ent. Soc. Wash., V, 208, 1903.

A large number of specimens collected in July, 1911, at Balsam, N. C., shows that the varieties described under the names *albogalleriella, nonstrigella* and *quadristrigella* form part of a series in which there is a gradual increase in the number of fuscous markings and in the extent of the wing occupied by fuscous scales, culminating in a fourth form in which the entire wing up to the first pair of dark streaks is suffused with fuscous, except the extreme costa.

In *O. albogalleriella* the entire wing is white, except for the apical dot and costal and dorsal streaks; some of my specimens have the dorsal dark spot faintly indicated by a few pale fuscous scales. Apical markings are absent in *O. nonstrigella,* according to Chambers' description; I have one specimen in which one costal streak and a streak beyond the apical spot are indicated by faint dark lines, thus approaching *quadristrigella,* which appears to be the most abundant form. In the darker specimens there is considerable variation in the amount of fuscous on the wing. In all of these specimens there is an additional dark dorsal streak, proximal to the dorsal streak referred to in the description of *quadristrigella,* and corresponding to the first costal streak in the variety *quadristrigella.* The suffusion of the basal three-fourths of the wing with fuscous varies; in some specimens it is confined to the dorsal half of the wing and is not deep enough to obscure the dark dorsal spot; in extreme forms the entire wing to the first pair of black streaks, except a narrow streak along the costa, is an almost uniform dark fuscous.

Gracilaria belfrageella Chambers.

Gracilaria belfrageella Chambers, Can. Ent., VII, 92, 1875; Dyar, List N. A. Lep., No. 6348, 1902.

Chambers described the species from captured specimens from Texas. A series of specimens bred on *Cornus asperifolia* Michx. at Cincinnati, one of which Mr. Busck has kindly compared with Chambers' type in the U. S. National Museum and pronounced identical with it, agree very closely, but show a few minor variations from the typical form, among them being the golden tinge of the face in some specimens, and the dark

tips of the middle and posterior tarsi. Rarely the costal pale triangle, instead of extending as a broad band along the costa, is divided into two spots.

The mine is placed on the under side of the leaf, and begins as a linear winding mine, abruptly enlarging into a whitish blotch, which later becomes wrinkled. The larva leaves the mine, forming the characteristic cone. Pupation takes place in a fold of the leaf.

On the same bushes at the same time is found the larva of a *Gracilaria* utilizing the entire leaf to make a very striking long cylindrical roll. It begins by rolling under the lateral edge of the leaf, continuing until the entire leaf is rolled up. The pupa in this instance is formed within the roll. The imagoes which issue from such rolls are almost indistinguishable from those obtained from the cones and regarded as the true *G. belfrageella* Cham. In these the separation of the costal triangle into two portions is of more common occurrence than in *G. belfrageella.* As yet I have been unable to find any mines different from those of *G. belfrageella,* and without such data, I cannot decide that this is a different species.

Gracilaria ostryaeella Chambers.

Gracilaria ostryaeella Chambers, Bull. Geol. Surv. Terr., IV, 121, 1878; Can. Ent., IX, 127, 1877.

Chambers named this species from a knowledge of the mine only, merely saying that "the larva when very small makes a linear whitish mine in the upper surface of the leaves." The same species is also briefly mentioned by Chambers in the *Canadian Entomologist* of the preceding year. The species is omitted in Dyar's list.

The mine to which Chambers refers is undoubtedly identical with one I have frequently found in the vicinity of Cincinnati on the upper side of *Ostrya* leaves. The mine is in general similar to that of *G. packardella* on sugar maple. Although linear at first the mine soon spreads out into a whitish blotch, lying over a vein, and sending out irregular finger-like processes. The blotch portion of the mine later becomes transparent and marked with a network of brownish veins. The

larva forms the usual characteristic cone by rolling down the tip of the leaf. These larvae are extremely difficult to rear, and I have succeeded in breeding but a single moth which emerged late in autumn. This specimen unquestionably represents *Gracilaria ostryaeella* Chambers.

On the underside of *Carpinus* between the lateral veins are narrow linear mines spreading out into flat blotches which become transparent and marked with a dark network of veins. When viewed from the upper side of the leaf, the completed blotch on *Carpinus* is remarkably similar to the upper side blotch on *Ostrya*. Specimens bred in September and October from the underside mines on *Carpinus* are identical with the specimen bred from the upperside mine on *Ostrya*. In spite of the different larval habit I think they must be regarded as belonging to the same species. An underside mine like that on *Carpinus* is found on *Ostrya,* and is doubtless also a mine of *G. ostryaeella* Cham.

The summer form bred from underside mines on leaves of *Carpinus* collected in July, emerges in the early part of August, and affords a remarkable example of seasonal variation. Its identity with the later form would never be suspected from captured specimens. The two varieties are described separately below.

Summer form: Antennae ocherous, tinged with bronze toward the base, becoming darker toward the tip and broadly annulate with dark brown. Labial palpi yellowish white, third joint annulate with dark brown just before the tip. Maxillary palpi yellowish white. Face, head and thorax pale golden, the vertex somewhat bronze. Forewings suffused with purplish bronze; a pale golden patch at the base, broadest on the dorsum; costal triangle pale golden, broadly truncated on the fold and extended outwardly as a band along the costa to the costal cilia. This pale patch is almost immaculate, there being only two or three brown scales on the costa. Hindwings fuscous, cilia reddish. Fore and middle legs dark purplish brown except the tarsi, which are white sometimes faintly tipped with black. Hind legs pale yellowish; a black patch externally on the apical half of the femora; tibiae and tarsi sometimes tipped with dark brown. Expanse: 9.5-10 mm.

Autumn form: Antennae grayish, annulate with dark brown. Labial palpi dark purplish brown except the inner side of the second joint, and the upper side near the base and extreme tip of the third

joint which are pale golden. Maxillary palpi pale golden, the joints brown toward their tips. Face golden below, head and thorax bronzy gray. Forewings suffused with purplish brown and speckled with patches of darker brown scales. An elongate patch of these scales lies just within the margin at the inner angle, leaving merely a narrow edge of golden color instead of the broad golden patch at the base in the summer form. In darker specimens this is also obliterated. The dark scales form a very distinct margining along the inner side of the pale costal triangle. The costal triangle is separated from the pale patch beyond (with which it is continuous in the summer form) by a patch of dark brown scales on the costa. The golden yellow color of the costal triangle deepens into purplish brown toward the costa where there are two or three small brown spots. The pale costal patch beyond is sometimes almost obsolete, because of the darkening of the color and the large admixture of dark brown scales. Hindwings and cilia fuscous. Legs as in the summer form, except that the tibiae of the hind legs and the tarsi are more deeply shaded with brown. Expanse: 9.5-10.5 mm.

The summer form reminds one strongly of a small specimen of *G. superbifrontella* Clem.; the autumn form is perhaps closest to *G. juglandiella* Cham., but the general color is lighter and more reddish, and the costal triangle is more distinctly outlined.

Gracilaria negundella Chambers.

Gracilaria negundella Chambers, Can. Ent. VIII, 18, 1876; Bull. Geol. Surv. Terr., III, 132, 1877; Psyche, III, 66, 1880; Dyar, List N. A. Lep. No. 6360, 1902.

The species to which Chambers originally gave the name *negundella* was bred from Box Elder in Colorado. Specimens bred from the same tree around Cincinnati do not agree with Chambers' description. These specimens are decidedly darker, but the distribution of the markings and particularly the markings of the legs and body are as Chambers has described them. A description which will serve better for the identification of the Eastern form is given below:

Antennae grayish, annulate with dark brown. Labial palpi yellow, the second joint dusted beneath and tipped with dark brown, the third joint dusted beneath and on the sides with dark reddish brown, with a broad annulus just before the tip. Maxillary palpi pale yellow, the joints tipped with brown. Face and head golden, the latter usually almost entirely suffused with purplish bronze. Thorax and forewings

pale golden, more or less suffused with bronzy brown or red, and flecked with dark brown scales. Costal triangle usually distinct and pale golden, broadly truncated on the fold and extended along the costa as a narrow band to the cilia. The costa within the costal triangle is marked with four or five black specks. There are three or four similar dark spots on the costa in the extended portion of the triangle, the first being the largest and sometimes separating the costal triangle from its prolonged portion, which is in this case more or less suffused with the darker shade. Fore and middle legs yellowish, the basal joints brown, femora and tibiae banded with reddish brown, these bands sometimes confluent; tarsi tipped with brown. Hind legs whitish, apical half of femora dark brown, tarsi tipped with brown. Underside of abdomen whitish, upper side dark smoky brown.

The mine begins as a narrow linear mine on the underside crossing to the upperside, where it spreads out into a rather large whitish blotch. The larva later feeds within conically rolled leaves as Chambers mentioned in the description of the species.

A new Microlepidopter of the genus Epicallima Dyar from Pennsylvania.

By August Busck, U. S. National Museum, Washington, D. C.

Epicallima lucidella, new species.

Labial palpi golden yellow. Antennae velvety black with silvery white tips; basal joint smooth without pecten. Face, head and thorax bronzy. The deep black ground-color of the forewings occupies but a small part of the wing as a margin on the base, along dorsum and around the apical edge to the brilliant deep golden yellow area which occupies the larger costal half of the wing and sends a long process out towards the apex; at basal third is a narrow perpendicular black-edged metallic blue fascia, crossing the golden area and terminating in a pale yellow dorsal spot; on the cell are two pairs of parallel longitudinal metallic blue streaks, all edged with black; on the middle of costa is a small pale yellow spot and at apical third is a similar pale costal dash. Cilia blackish with strong golden reflections. Hindwings and abdomen black. Legs black, with the tips of the tarsi and the spurs silvery white.

Alar expanse: 12-13 mm.

Habitat: Oak Station, Allegheny Co., Pennsylvania. Fred. Marloff, collector.

Type: No. 14435, U. S. Nat. Mus.

A brilliant species, suggesting some of the European metallic species, but very different in pattern. Among the American species it comes nearest the smaller *E. edithella* Busck, from which, however, it is also amply differentiated in pattern.

Collecting at the Water Gap.

By Annie Trumbull Slosson, New York City.

When, a few years ago, I deserted the happy hunting-grounds of the White Mountains and selected the Delaware Water Gap for a summer resort, I had faint hope of entomological success. The place was so near New York and Philadelphia, had been so hunted over for years, how could I expect to make any discoveries, capture new or even rare species? But as I look back over my records I am not at all ill pleased with the net results. The locality is almost ideal from the viewpoint of a naturalist. Well wooded, well watered, a rolling country with surrounding hills and real mountains to look up to or climb, it is a tempting spot for botanist, entomologist or general zoologist. Its insect fauna is rather peculiar, including both northern and southern species beside those commonly found in the Middle States, so-called. I have found there several insects which I had before taken only on Mt. Washington, and again some species which I have heretofore called southern and taken only in Florida have turned up at the Gap.

As some of you know, I no longer like "roughing it" when on a collecting trip. I stay at a comfortable hotel where, between my tramps, I can rest and eat under most favorable conditions. At the Gap my night collecting would be styled by strenuous entomologists almost criminally luxurious. A large private bathroom opened from my bedroom; its floor was tiled, its woodwork and walls pure white. It had one window and bright electric light. Before I went down to dinner in the evening the window was always opened to its fullest extent, the lights turned on and the door closed. Then, when I returned later at night, I found my "catch." Walls, ceiling and white bathtub were covered with specimens; certain families of Neuropteroid insects, Perlidae, Rhyacophilidae, Hydropsychidae and others were abundant. Among these Mr. Banks found several new to science and has since described such. In my latest number of Transactions of the Am. Ent. Soc. two of these are described by Mr. Banks, *Rhyacophila formosa*

—the specific name a fitting one for the exquisite little creature with its jet black wings spotted with white and yellow, and antennae ringed with black—and *Wormaldia plutonis,* a dark plutonic fellow in deep mourning.

The big *Corydalis cornuta* is common and has been brought to me dozens of times by bellboys and night watchmen, though let alone severely by the hotel guests of both sexes. A large Chauliodes, *pectinicornis* I think, flies occasionally into the house at night. I have found good species of Lepidoptera in that room, too. The first and thus far the only specimen I have captured of *Polygrammate hebraicum* Hub. was sitting on the white wall, where his green and black wings showed to the best advantage, one evening when I first looked at my trap. Coleoptera come there also, especially longicorns from the oaks near my windows. *Elaphidion villosum* is rather common and I have taken *unicolor* and *cinerascens* there, too.

Employes and guests show a kindly interest in my researches. As I came in from a walk one day I saw a young man whom I knew but slightly, sitting upon the stairs in a constrained position, head bent backward and eyes directed towards the top wall near the ceiling. As I spoke to him he answered in a greatly relieved tone that he had sat there over an hour, keeping his eye on "that bug up there" for me. The "bug" proved to be a good specimen of the handsome beetle *Eburia 4-geminata* Say., and the hearing of this sonorous name and trying to commit it to memory seemed an adequate reward to the patient watcher.

In the same bathtub of which I have spoken I found, this last summer, a fine specimen of the longicorn *Stromatium pubescens* Hald. It is a rare species in this part of the world, and one of our best-known coleopterists here (a shy man, so I will not name him) tells me he suspects it is but a wanderer from some other region and but of chance occurrence.

I take many rare, some new, species of Hemiptera at the Water Gap. Two specimens of a new capsid, one of each sex, were taken on different nights at the bottom of the bathtub, which was fortunately dry just then. It is a Phytocoris and has the manuscript name of *pruinosus* Heid.

I have two or three new namesakes among my Gap captures, but modesty forbids my enlarging upon these. One wet chilly day I started for a walk; but my net was soon useless, being soaking wet, and insects were scarce. I decided to give it up and return home. As I passed a low dwarfed sycamore I caught sight of an odd-looking lump on a leaf and knocked it into my damp net. It was a large Membracid new to me, and I sent it to Mr. Van Duzee. The very next day I received a letter from him telling me that this was a long lost species of Walker's, which he had never before seen, and that it settled a doubtful point for him as to the identity of another species described by himself. I was, of course, filled with joy and pride over my rare unique. But, a day or two after, a note from Mr. Van Duzee told me that, after hearing from me that the insect in question was found on sycamore, he had searched such trees and—found two specimens of the bug, right in the suburbs of Buffalo! He secured but one of the two, the other escaping from the net. I tried hard to sympathize with the loser, but fear I felt selfishly resigned to the thought that he now had no more than I had—just one. But a little later my second specimen was secured and now I earnestly hope that at least one more Buffalo bug of this sort will fall into the net of my good friend, the Hemipterist.

I was going to tell you of some other interesting captures made in this same locality, Odonata, Diptera and Orthoptera, but that story must wait till another time. However, I can assure you that I heartily agree with the ambitious bellboy, fresh from the country academy, who, after looking at a box of my insect treasures, exclaimed, "The Water Gap must be a very insectivorous place."

New West Indian Gall Midges (Dipt.).

By E. P. Felt, Albany, New York.

The following descriptions of new species are based upon material received during the past year from St. Vincent, W. I. The most interesting form is *Bruggmanniella pisoniae*, remarkable because of its presenting a combination of characters found

in *Schizomyia* and *Asphondylia,* and in being a form approximately intermediate between *Schizomyia* and *Cincticornia.*

Bruggmanniella pisoniae n. sp.

The interesting midge described below was reared May 5, 1911, by Mr. W. H. Patterson, St. Vincent, W. I., from stems of *Pisonia nigricans.*

Gall. The affected young stems show irregular elevations about 4 mm. long, each marking an oval cell some 3 mm. long. These cells are numerous, 8 or 10 occurring on a piece of stem some 4 cm. long and only about .5 cm. in diameter.

Larva. Length 2 mm., rather slender, yellowish orange. Head moderately broad, retracted. Antennae short, stout, apparently biarticulate. Breastbone apparently wanting. Segmentation distinct, the skin nearly smooth; terminal segment greatly reduced, irregularly conical, with a diameter about three-fourths that of the preceding segment and a length a little greater than its diameter.

Pupa. Length 2.5 mm., moderately stout, yellowish orange; cephalic and thoracic horns minute though distinct. Abdominal segments dorsally with a sparse basal row of moderately stout papillae, each with a chitinous apex, the general surface of the abdominal segments with rather coarse, irregular, chitinous plates; terminal segment with two pairs of submedian, conical processes and minor lateral processes.

Male. Length 1.75 mm. Antennae as long as the body, sparsely short haired, yellowish brown; 14 segments, the fifth with a stem one-fourth the length of the cylindric basal enlargement, which latter has a length thrice its diameter, a slight constriction near the basal third; basal, subbasal and apical whorls of short, stout setae and high, irregular circumfili closely resembling those of the male *Schizomyia;* terminal segment produced, with a length about four times its diameter, a marked constriction at the basal third and the apex broadly rounded. Palpi: first and second segments short, irregular, the third one-half longer than the preceding, fusiform. Mesonotum dark brown. Scutelium and postscutellum apparently yellowish brown. Abdomen rather thickly haired, dark brown, the genitalia fuscous. Wings hyaline, costa dark brown, the third vein uniting with the margin at the apex of the wing. Halteres yellowish. Coxae and femora basally yellowish, the distal portion of femora and tibiae fuscous straw, the tarsi darker; claws slender, simple, evenly curved, the pulvilli about half the length of the claws. Genitalia: basal clasp segment stout, narrowy conical, the apex subacute; terminal clasp segment subapical, its apex pectinate; dorsal plate short, divided, the lobes narrowly oval, coarsely setose; ventral plate short, broadly and roundly emarginate, the short lobes broadly rounded and thickly setose.

Female. Length 1.75 mm. Antennae about as long as the body, rather thickly haired, fuscous yellowish; 14 segments, the fifth with a stem about one-fifth the length of the cylindric basal enlargement, which latter closely resembles that of the male, though the irregular circumfili are not so highly developed as in the opposite sex; terminal segment reduced, sessile, with a length about twice its diameter, obtuse apically. The apex of the abdomen is expanded, bearing several irregularly triangular plates and a moderately short, stout, crooked, setose ovipositor with a distinct subapical enlargement. Other characters practically as in the male. Type Cecid. a2234.

Mycodiplosis pulvinariae n. sp.

Numerous larvae of this midge were found by Mr. W. H. Sands, St. Vincent, W. I., preying upon *Pulvinaria pyriformis,* and the midges reared therefrom were submitted to us through the courtesy of Mr. William H. Patterson of the Agricultural School. The species is allied to *M. coccidivora* Felt, though easily distinguished by the much stouter basal clasp segment in the male and the rather closely spined terminal lobes of the female.

Larva. Length 1.5 mm., yellowish, moderately stout, tapering slightly at both extremities and without a visible breastbone.

Pupa. Length 1.5 mm., salmon-colored, moderately stout. Thoracic horns filiform. Wing cases extending to the second abdominal segment, the anterior and mid-leg cases to the fourth, and the posterior leg cases to the fifth abdominal segment.

Male. Length 1 mm. Antennae one-fourth longer than the body, rather thickly haired, fuscous yellowish; 14 segments, the fifth having stems with a length one-half and one-fourth greater than their diameters, respectively; distal enlargement pyriform, with a length one-fourth greater than its diameter; circumfili moderately long, stout, setae long, stout. Palpi: first segment subquadrate, the second with a length about thrice its diameter, the third and fourth a little shorter than the second and successively more slender. Mesonotum dark brown. Scutellum and postscutellum yellowish. Abdomen fuscous yellowish. Wings hyaline, costa fuscous yellowish. Halteres yellowish. Coxae and femora basally yellowish, the distal portion of femora, tibiae and tarsi mostly dark straw. Claws slender, strongly curved, the anterior unidentate, the pulvilli rudimentary. Genitalia: basal clasp segment rather long, slender; terminal clasp segment relatively short, stout; dorsal plate long, deeply and triangularly incised, the lobes tapering and narrowly rounded apically; ventral plate moderately short, tapering to a narrowly rounded apex.

Female. Length 1 mm. Antennae nearly as long as the body, sparsely haired, fuscous yellowish; 14 segments, the fifth with a stem one-third the length of the cylindric basal enlargement, which latter has a length twice its diameter; circumfili moderately high, setae abundant, stout; terminal segment with a length about two and one-half times its diameter and a short, knoblike process apically. Ovipositor short, the terminal lobes lanceolate, narrowly rounded and apically with an irregular, sparse group of chitinous spines, the latter with a length about equal to half the width of the lobe. Other characters nearly as in the male. Type Cecid. a2233.

Arthrocnodax meridionalis n. sp.

This minute midge, easily separated from *A. abdominalis* Felt by the shorter stems of the flagellate antennal segments in the male, was reared May 7, 1911, by Mr. W. H. Patterson, St. Vincent, W. I., from open *Eriophyes* galls on the leaves of *Ruellia tuberosa* Linn. and doubtless preys upon the mites. A similar, if not identical species was obtained by this gentleman May 20, 1911, from *Eriophyes* galls on the leaves and bracts of *Lepidagathis alopecuroidea.* He reared the same species, April 6, 1911, from galls of *Eriophyes gossippii* on Sea Island Cotton and also on April 18th from mite galls on the leaves of a species of *Eupatorium.*

Larva. Length 1 mm., apparently yellowish, slender, the diameter being only one-fifth that of the length. Head and anterior body segments greatly produced, the former extensile and with a length about thrice its diameter. Antennae long, slender, curved, with a length about half the head; mouth-parts fuscous; the body segments with a transverse row of tubercles, each bearing a long, stout seta with a length about half the body diameter; terminal segment broadly rounded and with several sublateral setose tubercles. Pseudopods occur on the third to twelfth segments.

Male. Length .6 mm. Antennæ one-fourth longer than the body, thickly haired, yellowish brown; 14 segments, the fifth with stems having a length respectively one and one-half and one and one-fourth times their diameters; distal enlargement subglobose, the whorls of setae thick, long, the circumfili moderately stout. Palpi slender, the first and second segments quadrate, with a length one-half greater than the diameter, the third and fourth nearly equal, each with a length twice the diameter; mouth-parts somewhat produced, with a length one-half that of the head. Mesonotum reddish brown. Scutellum, postscutellum and abdomen probably yellowish. Wings hyaline, costa

light straw. Halteres yellowish. Legs a variable yellowish straw, the pulvilli as long as the slender claws. Genitalia: basal clasp segment long, stout; terminal clasp segment slender, swollen; dorsal plate broadly and triangularly emarginate, the ventral plate long, rather broad.

Female. Length .6 mm. Antennae nearly as long as the body, sparsely haired, yellowish; 14 segments, the fifth with a stem one-third the length of the cylindric basal enlargement, which latter has a length twice its diameter; terminal segment somewhat reduced, with a length one-half greater than its diameter, broadly rounded apically. Ovipositor as long as the body, stout, the lobes narrowly oval and sparsely setose. Type Cecid. a2235.

Hyperdiplosis producta n. sp.

This species was reared by Mr. W. H. Patterson, St. Vincent, W. I., from presumably mite galls in the inflorescence of *Stachytarpha jamaicensis*. It is provisionally referred to this genus.

Male. Length .75 mm. Antennae one-fourth longer than the body, thickly haired, yellowish; 14 segments, the fifth having the two stems with a length, respectively, twice and thrice their diameters. Distal node pyriform, each enlargement with a coarse whorl of stout setæ, the circumfili slender; terminal segment produced, the distal enlargement cylindric, with a length thrice its diameter and apically a slender, fingerlike process. Palpi: first segment subquadrate, the second with a length three and one-half times its diameter, the third probably as long as the second, the fourth probably one-half longer, somewhat dilated. Mesonotum, scutellum and postscutellum yellowish. Abdomen greenish yellow. Wings hyaline, costa light straw. Halteres yellowish. Legs pale straw; claws stout, strongly bent, swollen subapically, pulvilli rudimentary. Genitalia: basal clasp segment long, the slender terminal clasp segment slender, other structures indistinct.

Female. Length 1 mm. Antennae a little longer than the body, sparsely haired, yellowish; 14 segments, the fifth with a stem three-fourths the length of the cylindric basal enlargement, which latter has a length two and one-half times its diameter: a subbasal whorl of long, stout setae and a subapical band of somewhat smaller setae; terminal segment produced, with a length about thrice its diameter and apically a nearly equally long, tapering process. Ovipositor short, the lobes lanceolate and setose apically. Other characters nearly as in the male. Type Cecid. a2236.

Mr. E. B. Williamson, of Bluffton, Ind., is expected home about April 1 from a collecting trip in British Guiana and Trinidad.

ENTOMOLOGICAL NEWS.

[The Conductors of ENTOMOLOGICAL NEWS solicit and will thankfully receive items of news likely to interest its readers from any source. The author's name will be given in each case, for the information of cataloguers and bibliographers.]

TO CONTRIBUTORS.—All contributions will be considered and passed upon at our earliest convenience, and, as far as may be, will be published according to date of reception. ENTOMOLOGICAL NEWS has reached a circulation, both in numbers and circumference, as to make it necessary to put "copy" into the hands of the printer, for each number, four weeks before date of issue. This should be remembered in sending special or important matter for a certain issue. Twenty-five "extras," without change in form and without covers, will be given free, when they are wanted; if more than twenty-five copies are desired, this should be stated on the MS. The receipt of all papers will be acknowledged. Proof will be sent to authors for correction only when specially requested.—Ed.

PHILADELPHIA, PA., APRIL, 1912.

The Americans who expect to attend the Second International Entomological Congress, at Oxford, August 5-10, 1912, number more than those who were present at the First Congress at Brussels.

As far as known, the following will go to Oxford this coming summer: Prof. and Mrs. J. H. Comstock, Ithaca; Dr. and Mrs. Henry Skinner, Philadelphia; Mr. Henry H. Lyman, Montreal; Prof. Herbert Osborn, Columbus; Dr. W. J. Holland, Pittsburgh; Prof. Vernon L. Kellogg, Palo Alto, California; Mr. Nathan Banks, East Falls Church, Va., and Dr. and Mrs. P. P. Calvert, Philadelphia.

We hope there will be still more and trust they will send in their names to the Editor of the NEWS. Elsewhere in this number we reprint a part of a circular issued by the Reception Committee at Oxford. Copies of this circular, and blanks for subscriptions, for submission of titles of papers and for requisition of rooms may be obtained from Dr. Henry Skinner, member of the Executive Committee, Academy of Natural Sciences, Logan Square, Philadelphia.

Woe! Woe! Woe! Hear the voice of lamentation. How long! how long shall the deserving ones be scoffed at for their labors. Surely the worthy study of nature is becoming a babble of words, the worship of names supplanting a devotion to research. Has orthography parasitized entomology?

We hear in an authoritative voice from across the waters[1] that the "specific *name* and not the *species* is the only really new thing that is intended;" that "*n. sp.* whenever applied, signifies a new specific name only, and not a new species." Now, in fact, although "entomologists do not purpose to have created the insect they describe," they do propose to have defined a new species, new to science, new in the sense of having never been known. If that is not new, what is it?

Further, that voice still louder acclaims that priority shall be ignored in respect to certain names because these names are "obviously based on a barbarous and unmeaning gibberish, and . . . . must be rejected as null and void." Of course this is ridiculous and cannot stand; and it is to be regretted that these unmeaning names, these combinations of letters, must stand lords and masters over other good, well meaning names, which must be placed beyond further reach in the Sargasso Sea of synonomy.

It is further to be regretted that a well respected journal should give its pages to such a list of these good names that are thereby made worthless; and using the form of argument adopted by a fellow entomologist in another journal[2], if the scientific status of a publication is gauged by the quality of its contents, these pages will surely stand as an indissolvable stain, detracting seriously from its prestige.—E. T. C., Jr.

C(laude) M(orley) says in the Entomologist for March, 1912, p. 99, "We do not know Mr. Kearfott; but he has stirred up more animation in this country than we have seen displayed for a long time." Our hearty congratulations to Mr. Kearfott.—H. S.

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(1) The Entomologist's Monthly Magazine, Feb., 1912, p. 32.

(2) The Entomologist, March, 1912, p. 99.

Notes and News.

ENTOMOLOGICAL GLEANINGS FROM ALL QUARTERS OF THE GLOBE.

Prof. J. F. Tristan wrote from Nicoya, Guanacaste, Costa Rica, under date of February 4, 1912, "My wife and I left San Jose on the 9th of January and went to a new colony, Colonia Carmona, in the southern part of the peninsula of Nicoya. From that place we came here and then crossed the peninsula to the Pacific. We remained in a beautiful farm near the seashore for eight days, and then returned to this place [town of Nicoya]. On the 7th we shall go again to Colonia Carmona, where we will remain some days more. We hope to reach San Jose on February 25. In all this long trip and at different places I have collected Odonata for you. There are only two species that I have not seen before. Most of the species are very abundant." [Entomologically, the peninsula of Nicoya has been examined but slightly so that the data gathered by Prof. Tristán will be very welcome.—Ed.]

Second International Congress of Entomology will be held at Oxford on August 5th to 10th, 1912, under the Presidency of Professor E. B. Poulton, D.Sc., F.R.S.

A Reception Committee has been formed, consisting of:—Dr. F. A. Dixey, F.R.S. (Chairman). Professor G. C. Bourne, F.R.S. (Professor of Zoology). Professor H. L. Bowman, D.Sc. (Secretary to the Delegates of the University Museum). Professor E. B. Poulton, D.Sc., F.R.S. (President of the Second Congress). Geoffrey W. Smith, M.A. (Fellow of New College). Commander J. J. Walker, M.A. (Secretary of the Entomological Society of London.) H. Eltringham, M.A. (Cant.), M.A. (Oxon.), G. H. Grosvenor, M.A., Secretaries.

It is hoped that the Reception Committee will be able to arrange for members of the Congress to have rooms in the Colleges at a moderate price, but this privilege will be available for gentlemen only.

A list of hotels and lodgings recommended, with tariffs, will be issued later.

In order to facilitate the arrangements, it is requested that ladies and gentlemen who propose to join and attend the Congress send in their names as early as possible to the General Secretary of the Executive Committee, who will be happy to give any further information.

Ordinary Members who pay £1 (25 francs) will receive all publications of the Congress. Ladies and children accompanying Members will, on payment of 10s. (frs. 12.50) each, have all privileges of Members except that of receiving the publications.

Life Members who pay a composition of at least £10 (frs. 250), will receive free all future publications of the Congress.

The funds in respect of Life Compositions will be invested, and only the interest will be at the disposal of the Executive Committee. Sir Daniel Morris, D.Sc., and The Hon. N. Charles Rothschild, M.A., F.E.S., have kindly consented to act as Trustees of the funds.

Members who propose joining the Congress, or presenting papers, are requested to fill in the accompanying forms and send them in with their subscription (except of course in the case of Life Members who have originally paid) to the General Secretary of the Executive Committee, Malcolm Burr, D.Sc., care of Entomological Society of London, 11, Chandos Street, Cavendish Square, London, W.

The Programme of the Second Congress of Entomology will be sent out early in the spring, and, we believe, will be found so attractive that we shall have the pleasure of welcoming to Oxford a large gathering of Entomologists and friends of Entomology.

On behalf of the Committee, E. B. POULTON, *President;* MALCOLM BURR, *General Secretary.*

STRICT PRIORITY IN NOMENCLATURE—OR NOT?—[The following have been received in response to the editorial in the March NEWS. We hope to hear from many other entomologists. This subject will be discussed editorially in the May NEWS.]

Please place my name on the list of those who vote *against* the strict application of the law of priority in all cases, etc.—J. H. COMSTOCK.

I wish to register my vote *against* the strict application of the law of priority. Old names and old descriptions are often worthless and even misleading. Such of them as serve to clearly separate out from allied species rendering them clearly distinguishable, and not, as in many cases, applying to aberrant forms, should be retained.

The time was when the describing and naming of insects was an end; but now it has ceased to be such and has become an imperatively essential means toward tracing out their development and interrelationships. Priority, like any other law that does not admit of progressive, intelligent and practical application, is sadly in need of either amendment, or elimination. Nature does not compel an insect to carry about with it the cast larval skins and pupa case, but enables it to discard these as they cease to be useful.—F. M. WEBSTER.

Relative to the question of abandoning the law of priority as discussed editorially in the last number of the NEWS, I would say that this step must have been approved by the entomologists mentioned with scarce appreciation of what a fearful condition it is apt to lead to. Most systematists know of one or more preoccupied genera which they are very reluctant to see changed, and if a proposition is suggested to disregard a law which prohibits the retention of such personally favored genera, they are apt to center their thoughts on that one point and so

vote for the annulment of a law that may be essential and desirable in nearly all other cases. Such a motion was voted down at the meeting of the Entomological Society of America at the recent Washington meeting because of the discussion the matter evoked. When a motion meets with opposition and arguments on both sides of the question are presented, the voters are enabled to deal more intelligently with the matter and a fairer and more meaning vote is the result. Thus the Entomological Society of America voted to retain intact the law of priority. When questions of nomenclature are no longer solved according to codified laws and rules, but are submitted to the varying judgment of different workers, we may abandon all hope of an ultimately stable nomenclature. That the law of priority should always be retained intact is my earnest belief and you may record my vote to this effect.—A. N. CAUDELL.

I hasten to ask that my name be put down on the side of the second proposal in your editorial column, in favor of the preservation of the most used names against unused names claiming priority.

This looks like the glimmering of the dawn of a brighter day in nomenclature. After we get past the period of priority-worship, scientists will look back in astonishment at the actions of the last decade or two.—J. M. ALDRICH, Moscow, Idaho.

WEEVILS OF MEXICO AND CENTRAL AMERICA.—[The Coleoptera part of the *Biologia Centrali-Americana* has been completed with the appearance of Volume IV, Part 3, on certain groups of the Curculionidae. Much interest therefore attaches to the "Introduction" of this Part, which we quote as follows:]

This volume, one of five required for the enumeration of the Rhynchophora, was commenced by Dr. Sharp in 1889 and is now concluded by myself. The study of the "Otiorhynchinæ Alatæ" has unfortunately been delayed for many years, during the publication of Vol. IV, parts 4, 5 and 7, all of which are devoted to the Family Curculionidæ. The present Volume, IV. part 3, includes the Sub-families Attelabinæ, Pterocolinæ, Allocoryninæ, Apioninæ, Thecesterninæ, and Otiorhynchinæ. The Attelabinæ are represented by 104 (88 new), the Pterocolinæ by three (all new), the Allocoryninæ (a new sub-family) and Thecesterninæ each by one, the Apioninæ by 88 (84 new), and the Otiorhynchinæ by 419 (340 new) species respectively; the total number for the six sub-families being 616 species, with 516 new, and forty new genera. Amongst the 419 Otiorhynchinæ, the apterous and winged forms are almost equal in number, there being a preponderance of apterous terrestrial species (*Eupagoderes, Epicoerus, Epagriopsis,* etc.) in the arid portions of Mexico and the winged forms (*Exophthalmus,*

etc.) becoming relatively more numerous in the forest regions southward. Taking the Curculionidæ as a whole—the sub-families Curculioninæ and Calandrinæ, in addition to those worked out in the present volume—the number of species enumerated altogether from Central America is as follows: Vol. IV, part 3, 616; IV, part 4, 1365; IV, part 5, 908; IV, part 7, 344; total 3233. The three other families of Rhynchophora—the Brenthidæ, Scolytidæ and Anthribidæ—dealt with in Vol. IV, part 6, number 615 species, thus bringing the total for the whole of the weevils up to 3848. The Rhynchophora, therefore, as anticipated (though not to the extent roughly estimated by myself in the introduction to Vol. IV, part 4 of this series), greatly outnumber the Phytophaga (2619, including the Hispidæ and Cassididæ) within our limits.

The Otiorhynchid material examined by me includes that belonging to the U. S. National Museum, to whom we are indebted for co-types of all the species here described from their collection, as well as for many North American forms for comparison. From Costa Rica we have received during recent years numerous interesting species, both from Pittier and Biolley. Mr. Wickham, too, during his visit to Mexico in 1909, secured various Otiorhynchids, and, as usual, has kindly allowed us to retain any of these specimens that we required. Signor A. Solari again, has also permitted us to keep for the British Museum the types of such species as have been described by me from his collection, which includes a portion of that of Jekel. The "Sommer collection" of Curculionids (including various types of Boheman, etc.) having been recently acquired by Prof. Poulton for the Oxford University Museum, we have been enabled to verify the names of certain species left unidentified by Dr. Sharp, and this involves some slight corrections to the synonymy of the "Otiorhynchinæ Apteræ," which are noted in the Supplement.

As stated in a footnote on p. 317, various Apioninæ left undetermined by Dr. Sharp for want of sufficient material, with such forms that have since come to hand have been handed over to the specialist Herr Hans Wagner for study, and his descriptions of the new forms will be published elsewhere.

Of the fifteen colored plates issued, the first six were drawn by Mr. Purkiss, the others by Mr. E. Wilson, of Cambridge.

It will not be out of place to note here that the enumeration of the Coleoptera, commenced in 1879, is now completed, bringing the total number of species to 18,039, for which eighteen volumes have been required.—G. C. Champion, December, 1911.

ALETIA ARGILLACEA (Lepid.) Since the flight of this moth last fall seems to have attracted the attention of observers in different parts of the country, it may be worth while to put on record the notes I made at the time of the appearance of the horde at Iowa City. If data from different sections are properly correlated, we may learn something definite and valuable regarding the speed, extent and exciting causes of the movement. My notes, with one or two slight verbal changes to make them comprehensible to the general reader (by the omission of certain purely local references), are as follows: "October 1, 1911. This morning, on going to the post-office, I noticed that the side of the building around the south door was plentifully sprinkled with these moths, most of them resting head downward on the stone wall, others clinging to the globes or supports of the two large lights with less regularity of pose. In one place four of the insects were resting in a row, the thorax of each of the last three tucked under the wings of the one preceding. The moths seem very fresh and in fine condition. I counted 100 at this place and estimated that there must be at least 150 in the group. At the west door only about twenty were to be counted. On the way home I saw them in abundance on the electric light poles along Iowa Avenue, and on one corner they were plentiful in the grass at the base of the support, flying out in numbers when disturbed. This flight has followed two or three days of unsettled, more or less rainy weather. On the night of the 29th of September there were none about the avenue lights, since Mr. Stoner and myself had been out looking for beetles and would certainly have noticed the moths had they been present. The invasion seems to have been sudden, and to have taken place last night." A note made the next day (October 2) refers to the great abundance of the moths on poles at various points about town. In one place 35 were counted on a space about the size of the palm of my hand. A later item states that five days later scarcely any were left. This is the second really large flight of the species that I have seen at Iowa City, the other taking place in 1898, my record specimens carrying dates from September 7 to October 8, the majority being September 21.—H. F. WICKHAM, Iowa City, Iowa.

[In addition to the notes by Mr. Muttkowski and Dr. Skinner in the NEWS for February, 1912, and November, 1911, respectively, other observations on the swarms of this species are published in Journ. N. Y. Ent. Soc. xix, p. 259, for Dec., 1911.—*Ed.*]

THE ACADEMY OF NATURAL SCIENCES OF PHILADELPHIA celebrated the One Hundredth Anniversary of its foundation by a three days' series of meetings, a reception by the President, and a banquet, on March 19th, 20th and 21st.

Entomological Literature.

COMPILED BY E. T. CRESSON, JR., AND J. A. G. REHN.

Under the above head it is intended to note papers received at the Academy of Natural Sciences, of Philadelphia, pertaining to the Entomology of the Americas (North and South), excluding Arachnida and Myriapoda. Articles irrelevant to American entomology will not be noted; but contributions to anatomy, physiology and embryology of insects, however, whether relating to American or exotic species, will be recorded. The numbers in **Heavy-Faced Type** refer to the journals, as numbered in the following list, in which the papers are published, and are all dated the current year unless otherwise noted. This (*) following a record, denotes that the paper in question contains description of a new North American form.

For record of Economic Literature, see the Experiment Station Record, Office of Experiment Stations, Washington.

4—The Canadian Entomologist. **6**—Journal, New York Entomological Society. **7**—U. S. Department of Agriculture, Bureau of Entomology. **8**—The Entomologist's Monthly Magazine, London. **9**—The Entomologist, London. **11**—Annals and Magazine of Natural History, London. **18**—Ottawa Naturalist. **22**—Zoologischer Anzeiger, Leipzig. **34**—Proceedings, Iowa Academy of Sciences, Des Moines. **38**—Wiener Entomologische Zeitung. **40**—Societas Entomologica, Zurich. **46**—Tijdschrift voor Entomologie. **51**—Novitates Zoologicae, Tring, England. **69**—Bolletino, Societa Italiana Entomologica. **73**—Archives, Zoologie Experimentale et Generale, Paris. **79**—La Nature, Paris. **84**—Entomologische Rundschau. **89**—Zoologische Jahrbucher, Jena. **97**—Zeitschrift fur wissenschaftliche Zoologie, Leipzig. **153**—Bulletin, American Museum of Natural History, New York. **179**—Journal of Economic Entomology. **182**—Revue Russe d'Entomologie, St. Petersburg. **190**—Deutsche Entomologische Zeitschrift "Iris," Dresden. **193**—Entomologische Blatter, Cassel. **216**—Entomologische Zeitschrift, Stuttgart. **223**—Broteria. Revista de Sciencias Naturaes do Collegio de S. Fiel. (Ser. Zoologica). **240**—Maine Agricultural Experiment Station, Orono. **337**—Meddelelser om Gronland. Denmark Ekspeditionen til Gronlands Nordostkyst 1906-08, Copenhagen. **346**—Fauna Exotica. Mitteilungen aus dem Gebiete der exotischen Insektenwelt, Frankfurt am Main. **368**—The Monthly Bulletin of the State Commission of Horticulture, Sacramento, Cal. **369**—Entomologische Mitteilungen, Berlin-Dahlen. **371**—Memoires de la Societe des Naturalistes de Kieff. **372**—Imperial Department of Agriculture for the West Indies. **373**—Contributions to the Natural History of the Lepidoptera of North America, by Wm. Barnes and J. H. McDunnough, Decatur, Ill.

GENERAL SUBJECT. **Ballou, H. A.**—Insect pests of the cocoa-

nut, **372,** Pamphlet Ser. No. 70, 21-34. **Gennerich, J.**—Treibzucht durch einwirkung grunen lichtes, **216,** xxv, 235-236. **Horn, W.**—Skizzen aus der geschichte des "Deutschen Entomologischen Museums," **369,** i, 33-38. **Janet, C.**—Sur l'ontogenese de l'insecte 1909, F. 28, Limoges, 129 pp. **Johansen, F.**—Freshwater life in Northeast Greenland, **337,** v, 321-337. **Johannsen, O. A.**—Insect notes for 1911, **240,** Bull. No. 195. **Marlatt, C. L.**—Some recent new importations (insect pests), **179,** v, 73-77. **O'Kane, W. C.**—Methods in insect photography, **179,** v, 54-59. **Poche, F.**—Die motive und ziele der modernen nomenklaturbewegung, **182,** xi, 253-260. **Portier, P.**—Recherches physiologiques sur les insectes aquatiques, **73,** viii, 89-379. **Reitter, E**—Ueber den eingeburgerten missbrauch bei benutzung von entomologischen typen, **38,** xxxi, 21-26. **Rosa, D.**—Il lamarkismo e le farfalle, **69,** xlii, 39-42. **Sanderson, E. D.**—Insect pests of farm, garden and orchard, New York, John Wiley & Sons, 684 pp, 1912. **Washburn, F. L.**—The relation of the station entomologist to his environment, **179,** v, 33-53. **Weiss, H. B.**—Some economic methods a hundred years old, **179,** v, 88-90 .

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Insect Pests of Farm, Garden and Orchard. By E. Dwight Sanderson, Dean of the College of Agriculture, West Virginia University; Director West Virginia Agricultural Station; John Wiley & Sons, New York; Chapman & Hall, London. Price, $3.00 net.

The growth of economic entomology is so rapid that we may no longer expect to see books covering the whole field. In the future we will expect to see special works devoted to branches of the subject. Prof. Sanderson's book is made up of 669 pages, an index, and 513 illustrations. The sources of illustrations are given and it is a proper courtesy, but does anyone ever read the long lists of figures? The amount of damage done by insects annually is a very real one, and Prof. Sanderson places it at the nice sum of $1,272,000,000 (grand total.) A grand total like that should be a splendid thing with which to dazzle Congress, State Legislatures, institution officials and others, for increased appropriations and increased salaries. This sum is not inconceivable, but "almost." The sequence of subjects treated is a logical one and the various insect enemies of certain species of plants

or groups of allied plants are treated under those headings. The large number of illustrations of injurious insects, coupled with their description, should enable any intelligent person to identify them and apply the appropriate remedy. The book is written in a lucid way and should prove very useful. Prof. Sanderson has had a wide experience as an economic entomologist and has used judgment in the selection of remedies and control measures. The work covers the subject admirably and as well as it is possible to treat such a large subject within the pagination of a single book.—H. S.

CONTRIBUTIONS TO THE NATURAL HISTORY OF THE LEPIDOPTERA OF NORTH AMERICA, Vol. I, No. 3, Revision of the Megathymidae. By William Barnes, S.B., and J. H. McDunnough, Ph.D.

The authors call the family "giant skippers" and are "inclined" to give them super-family rank as Hesperiides. They do not consider them related to the Castniidae, where they have been placed by some authors. The comparative anatomy of the group, early stages and habits as far as known are discussed in detail. The authors found the sexual organs of value in specific separation and they were given special consideration. The genus *Aegiale* Felder is used for the species *hesperiaris* Walk., and the other species are placed under *Megathymus* Scudder. *Aegiale* is separated from *Megathymus* by differential characters in the pulvillus, the squamation of the palpi and the wing venation in the male. The Boreal American species have twice been previously been treated as a whole; by Dyar, Journ. N. Y. Ent. Soc. 13, 111, 1905, and by Skinner, Trans. Amer. Ent. Soc. 37, 169, 1911.

Some of the species are rare in collections. *Smithi* was mentioned by Skinner on pages 170 and 205. It was not in the table as no material was at hand for study. No detailed study was made of *Megathymus* in Dr. Skinner's paper as he knew that the present authors had their paper well under way. Dr. Dyar need not have confused *streckeri* and *cofaqui* as he studied Dr. Skinner's material containing the types of *streckeri* and one male and two females of *cofaqui*. The authors have carefully examined all the literature of the subject and commend the work done by Dr. Skinner, saying Skinner's identifications "appear" to be correct.

Their studies of *M. neumoegeni* are extremely interesting. This species was described by Edwards, from one "male" and three females. Barnes and McDunnough say that the type with the male label on it is a female. It is not unlikely that Mr. Edwards confused the sexes, as it is a very easy thing to do if you do not dissect out the genitalia. Ottolengui says that Doll caught seven specimens. Barnes says he has a male of the original lot and states there is also a male in the

Strecker collection. There is also a male of the original lot in the collection of the Academy of Natural Sciences of Philadelphia. The male of this species was redescribed by Dyar under the name *aryxna*. Barnes and McDunnough find two species in the "type series" of *aryxna*. It seems a pity to have such an elastic series and in the future it will be well for Dyar, McDunnough and Barnes to fix a single type. After the careful examination of a good series of specimens I am unable to see anything more than individual non-specific differences between *neumoegeni* Edwards and the *aryxna* of Barnes and McDunnough. All the characters they give appear to the writer as gradational, including the genitalic. We need much better and additional evidence before specific value can be accepted.

M. polingi Skinner was described from two specimens supposed to be male and female. The type and paratype prove to be females as stated by the authors of this paper. They had over one hundred specimens of both sexes for study, and were able to detect the fact that Dr. Skinner erred as to the sex of one specimen. The writer does not assume any obligation to take cognizance of letters at a particular time. When statements appear in the literature they are placed on an entirely different basis.

The authors place *M.* var. *navajo* as a synonym of *coloradensis* Riley. If a black form as compared with a light chestnut brown one is not sufficient difference to constitute a variety, then they are correct. Riley in his original description said, "This Colorado form is remarkable for its small size and the paleness of its colors." There can be no question about the meaning of the above. It refers to the color of the insect and not alone to maculation as the two authors state. The Academy of Natural Sciences possesses one of the cotypes of *coloradensis* and it has not faded since it was caught and it is a light chestnut brown in color, whereas *yuccae* is dark umber-brown and *navajo* black.

M. cofaqui Strecker is a very distinct species, both in maculation and in the male genitalic characters. The male has a buff border on the upper side of the secondaries, otherwise the markings are the same as in the female, except that the row of spots on the secondaries is almost obsolete. The male specimen of *streckeri* bearing the type label, was taken in Arizona by Morrison. State labels were the fashion when it was captured and it can only be said that it was taken in one of the various localities in Arizona where Morrison is known to have collected.

Barnes and McDunnough have given us an able paper which has considerably advanced our knowledge of the family. There are still questions that need elucidation and they will be solved in the future. —H. S.

Bibliographia Coleopterologica. Under this title W. Junk, the Entomological publisher and antiquarian bookseller of Berlin (W. 15. Kurfurstendamm 201), has brought out a catalogue of 3928 Coleopterological books and memoirs, arranged alphabetically under authors' names, which he has for sale. The edition of this Bibliographia which is bound in linen boards, includes fourteen pages on "Die Coleopterologische Literatur," which gives the principal works of reference on this group of insects under such headings as: For the Beginner (German), Coleoptera of Central Europe, Nomenclature, Larvae, French fauna, Nearctic Region [where Blatchley's Coleoptera of Indiana has not yet found a place], etc. This edition is sold at one mark, and this summary of the literature (which is lacking in the paper-bound copies distributed free) should be very useful.

Doings of Societies.

AMERICAN ENTOMOLOGICAL SOCIETY.

Meeting of December 11, 1911. Dr. Philip P. Calvert, President, presiding. Nine persons were present.

Reports of the various officers and committees for the year 1911 were read. The report of the Librarian recorded four thousand volumes in the library of the Society and recommended the purchase of additional bookcases for the new quarters.

The President announced the deaths of two former Presidents, the Rev. Henry C. McCook, D.D., on October 31st, and J. H. B. Bland on the 12th of November, aged 79.

The following persons were elected to serve as officers for the year 1912: President, Philip P. Calvert; Vice-president, Henry W. Wenzel; Treasurer, E. T. Cresson; Curator, Henry Skinner; Recording Secretary, Henry Skinner; Corresponding Secretary, J. A. G. Rehn. Executive Committee: Philip Laurent, H. W. Wenzel, D. M. Castle. Publication Committee: E. T. Cresson, C. F. Seiss, B. H. Smith. Finance Committee: C. S. Welles, D. M. Castle, Morgan Hebard.

Meeting of February 15, 1912, Mr. Philip Laurent in the chair. Seven persons were present.

Mr. E. T. Cresson was appointed a delegate to represent the

Society at the Centenary of the Academy of Natural Sciences of Philadelphia, to be celebrated March 19, 20 and 21.

Mr. Laurent called attention to Circular 144, U. S. Dept. Agric., and said he was not previously aware that *Scolytus quadrispinosus* injured the small stems and buds of the hickory.

He also read a newspaper clipping, dated Woodbury, N. J., January 30th, which read as follows: ". . . According to fruit experts the yield of South Jersey the coming season ought to be a record breaker. These men declare that when the trees have a coating of ice once during the winter the following season is prolific in the yield as the ice kills any pests that may have clung to the bark. Thus far there have been three sleet storms, and at present every tree in Gloucester County has a half-inch ice coating." The speaker asked whether it was a fact that ice kills scale and other bark insects.

Dr. Skinner made some remarks on the so-called Pharmacophagus *Papilio, P. philenor* and its alleged mimics, *Papilio glaucus, polyxenes* and *troilus*. The records of birds attacking these insects are very meager and it is doubtful whether *P. philenor* is poisonous or noxious to birds. A large amount of careful experimental evidence will be necessary to prove that the three species, in the female sex, mimic *philenor,* and that their markings were thus developed.

Mr. E. T. Cresson, Jr., suggested that *Dasyllis* may mimic the non-predaceous bumblebee so that it may deceive other insects on which it feeds, the latter mistaking it for a bumblebee and not making an effort to escape.

HENRY SKINNER, *Sec'y.*

OBITUARY.

PROFESSOR JOHN B. SMITH, State Entomologist of New Jersey, eminent as an Economic Entomologist, endeared to many friends by his personal qualities, author of important memoirs on Lepidoptera and Coleoptera, died at New Brunswick, New Jersey, on March 12, 1912. An account of his life and work will appear in the next number of the NEWS.

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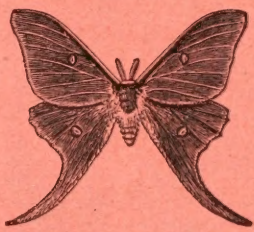

PAN-AMERICAN EXPOSITION
Gold Medal

ST. LOUIS EXPOSITION: Grand Prize and Gold Medal

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